



Spectral Gamma-Ray Borehole Log Data Report

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Borehole

21-00-05

Log Event A

Borehole Information

Farm : <u>BX</u>	Tank : <u>BX</u>	Site Number : <u>299-E33-62</u>
N-Coord : <u>45,339</u>	W-Coord : <u>53,250</u>	TOC Elevation : <u>659.01</u>
Water Level, ft :	Date Drilled : <u>11/30/1947</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.320</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

Borehole Notes:

Borehole 21-00-05 was drilled in October and November 1947 and completed to a depth of 150 ft with 8-in.-diameter casing. The driller's log reports that the casing was perforated from 40 to 100 ft in March 1948 with a staggered pattern of five holes per foot. There is no mention of grouting, and it is assumed that there is no grout plug in the bottom of the borehole.

The top of the casing is the zero reference for the log; the casing is surrounded by a gravel mound. The casing lip is inside a plastic valve box and is approximately 4 ft above the ground surface. The depth of the borehole was measured with an electric tape as 134 ft. There is no indication as to how the bottom 16 ft of the borehole was filled.

Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>02/1997</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>05/27/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>55.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>05/28/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>133.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>54.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 08/12/1997

Analysis Notes :

This borehole was logged by the SGLS in two log runs. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation. There was some gain drift during logging operations, and it was necessary to adjust the established channel-to-energy parameters during processing of log data to maintain proper peak identification.

Casing correction factors for a 0.330-in.-thick steel casing were applied during analysis. Correction factors for a 0.320-in. casing were not available. Use of the correction factor for 0.330-in. casing will cause all calculated radionuclide concentrations to be slightly higher than the actual concentrations.

The man-made radionuclides Cs-137 and Co-60 were detected around this borehole. The presence of Cs-137 was measured continuously from the ground surface to a depth of 7.5 ft, from 26 to 26.5 ft, continuously from 40.5 to 49 ft, intermittently from 50 to 62 ft, continuously from 63 to 71 ft, and intermittently from 71 to 106 ft. The maximum Cs-137 concentration was about 6 pCi/g at 2 ft. Co-60 contamination was detected intermittently from a depth of 72.5 to 121.5 ft. The measured Co-60 concentrations ranged from 0.1 to 0.3 pCi/g, which is very close to the MDL.

The K-40 concentration values increase at about 36 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks BX-101 and BX-102.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.



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Plots of the spectrum shape factors are included. The plots are used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.